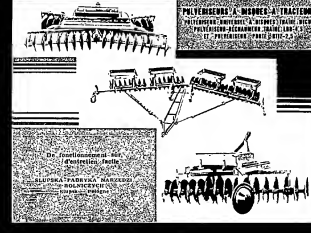
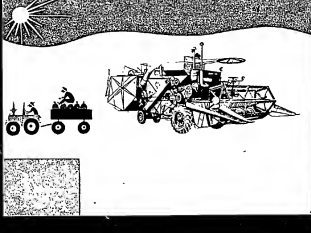
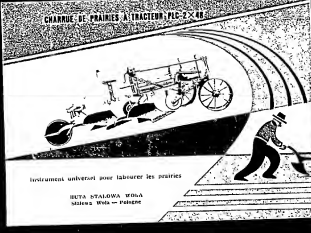
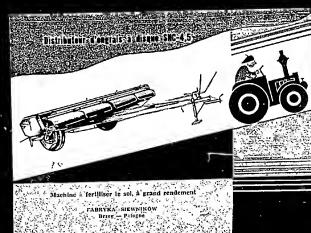
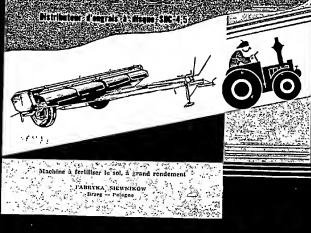
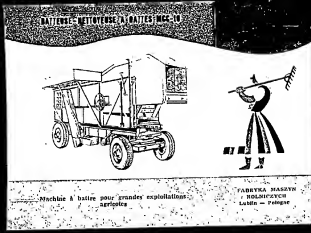
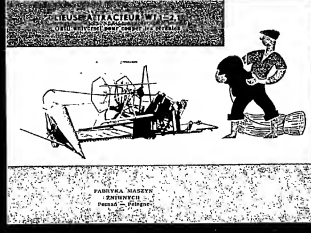
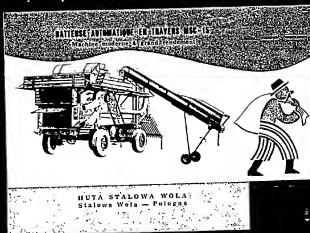
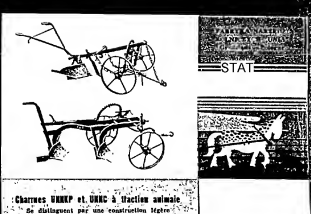
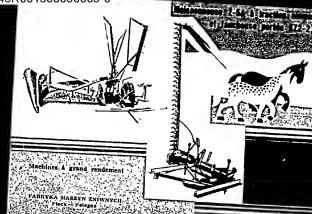


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POKAZ POLSKIEGO CYWILNEGO EKSPORTOWEGO SPRZĘTU LOTNICZEGO
Leczenie odbyło się na ławisku Gocław w dniu 15.X.1957 roku o godz. 10tej



Les charreuses sur rails de roue UNRRP à traction animale servent au labour des terres profondes et semi-comfortes, leur avantage est de deux roues diminue considérablement l'effort du laboureur.

Les charreuses à cadre UNNG à traction animale sont accommodées aux travaux sur toutes terres et ne nécessitent pas d'attelage pendant le travail. Elles se distinguent, en outre, par l'absence de remorque de terre faibles et la précision du retournement.

Caractéristiques	Sécatification			
	W10-S	W10-R	W12	W11-1
Profondeur de la sauge, en cm	11	20	18	24
Longueur de la sauge, en cm	15	26	40	42
Nombre de récoltes à l'arrachage	2	4	7	7
Yields en kg	1	2	32	105

Abstract

boyer le sé à épis et les plantes siliculeuses animal qui sélectionner le grain. Grâce au battage en travers on élimine des brins de paille renaissant droits. La coque est acier assure une bonne rigidité à la construction toute entière. Les roues de transport à grous facilitent le transport de la balleuse par tous terrains.

Gravidade de lesões	100 mm
Longevidade	100 mm
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99 lesões	100 mm
100 lesões	100 mm

Centra de Comandare Exterioară
Wawrzyszka, 1/2 (act), al. 25, Polona
Găsește poșta 243
Adă Telefonică: MOTO 1111 (Wawr)



La planteuse SK-2a est destinée à planter les pommes de terre en deux rangs en culture à sillons ou à plat. Cette planteuse fait des sillons, dépose les pommes de terre et les recouvre pendant un seul passage. L'arracheuse TEK-2a déterre les pommes de terre de deux rangs à la fois, les débarrasse

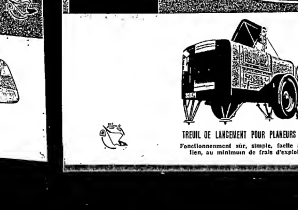
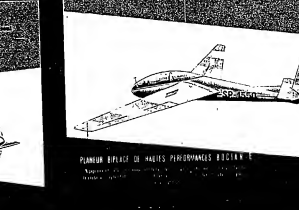
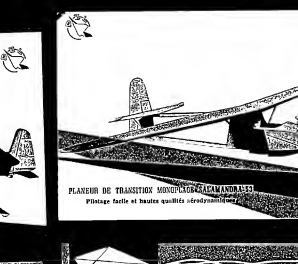
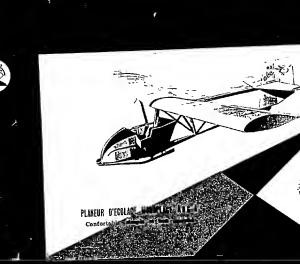
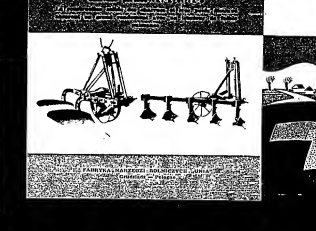
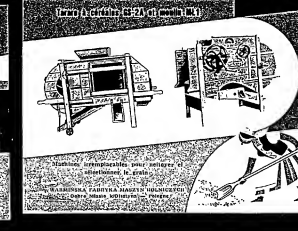
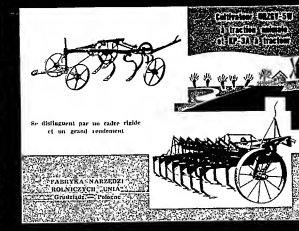
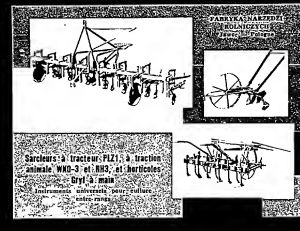
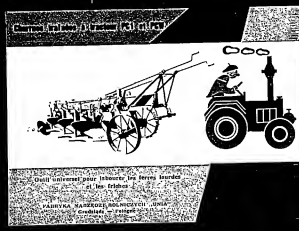
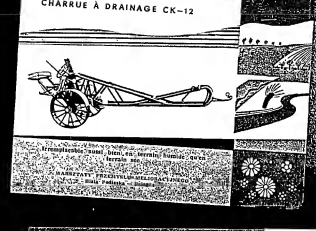
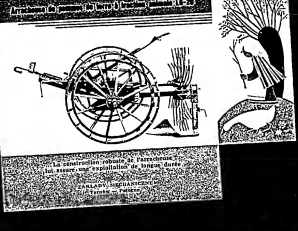
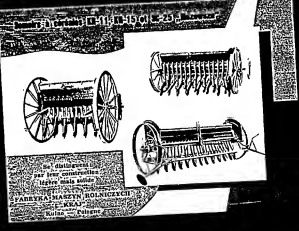
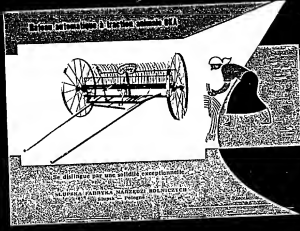
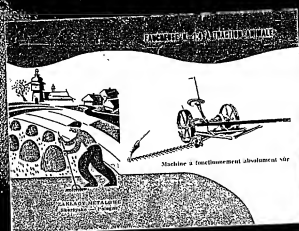
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1. Características de la planta	10-10	10-10
2. Plagas y enfermedades	10-10	10-10
3. Plagas y enfermedades	10-10	10-10
4. Plagas y enfermedades	10-10	10-10
5. Plagas y enfermedades	10-10	10-10
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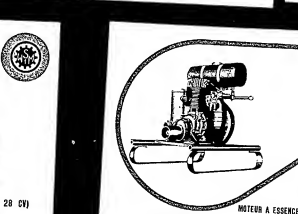
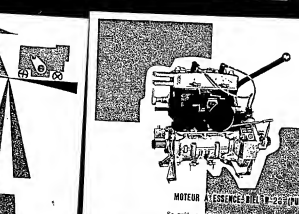
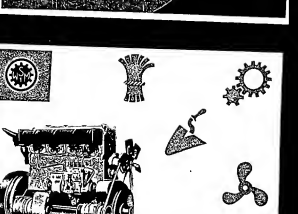
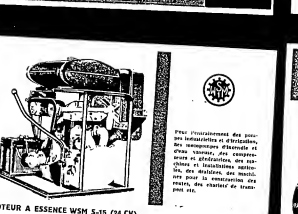
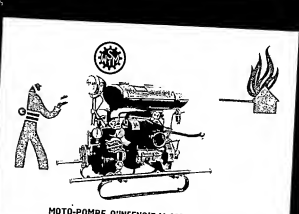
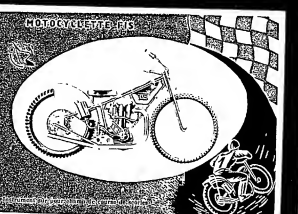
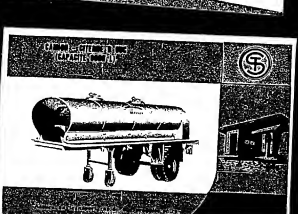
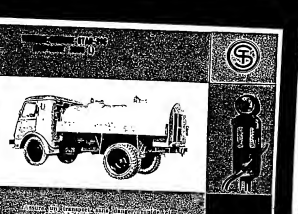
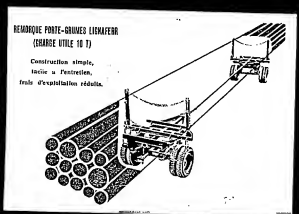
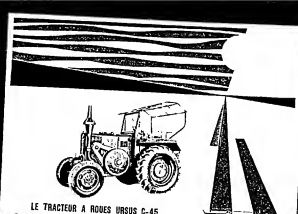
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 Warszawa, Przemysłowa 25, Północ
 Ofice postale 245
 Adres - Telegramm: MOTOM, Warszawa

Le pulvérisateur LBD-45 est destiné au désherbage peu profond sur de grandes étendues.

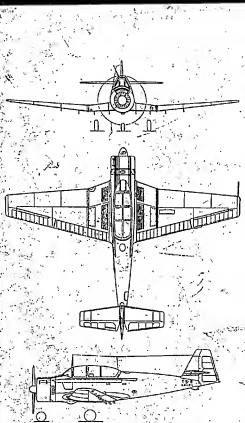
Eclairage			
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MOTOIMPORT
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Adr. Télégraphique: MOTONIM Warszawa



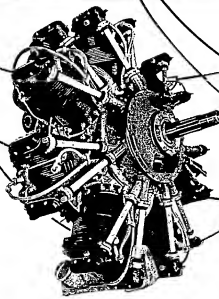






TECHNICAL DATA

- Crew** — 2 persons
- General layout** — Cantilever low-wing monoplane
- Construction** — all metal — stressed skin
- Landing gear** — tricycle type, pneumatically retractable
- Power plant** — WSK, seven cylinder, air-cooled radial engine, rated at 320 h. p.
- Propeller** — WSK, two blade, "constant speed" type, diameter — 2.2 m.
- Equipment** — VHF transmitter (receiver)
- radiocompass
- 2 sets of blind flight instruments
- interphone installation
- double type
- Controls** —
- Dimensions:**
 - Span — 10.5 m. (34.44 ft.)
 - Length — 8.55 m. (28.04 ft.)
 - Wing area — 19.1 m². (205.6 sq. ft.)
- Weights:**
 - Weight empty — 1070 kg. (2354 lbs.)
 - All up weight — 1550 kg. (3410 lbs.)
- Performances:**
 - Maximum speed — 310 km/h. (192 m.p.h.)
 - Cruising speed — 270 km/h. (168 m.p.h.)
 - Landing speed (with flaps extended) — 90 km/h. (56 m.p.h.)
 - Rate of climb — 6.5 m./sec. (1220 ft./min.)
 - Service ceiling — 5000 m. (16400 ft.)
 - Range — 475 km. (420 miles) (endurance 2.5 hours)

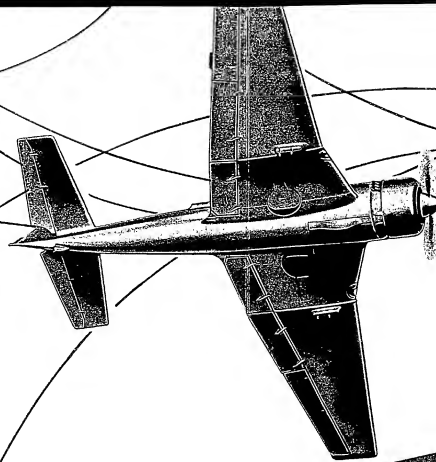


Seven-cylinder, air-cooled radial engine with a take off power of 320 h. p., light, durable and with low fuel consumption is an important factor in success of the aircraft.

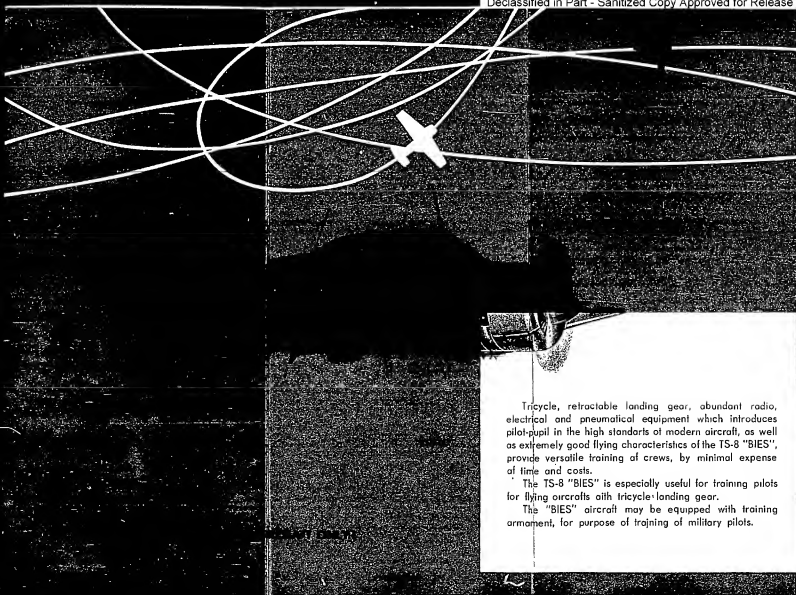
Low thermal loading of the engine makes the aircraft suitable for hot climate operation.



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**THE
AIRCRAFT
TS-8 "BIES"**
SCHOOL AND TRAINING AIRCRAFT

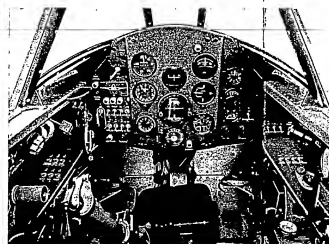
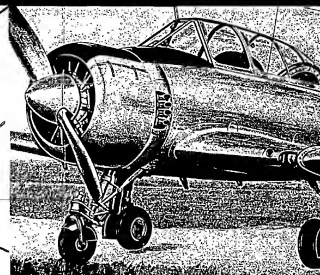


Tricycle, retractable landing gear, abundant radio, electrical and pneumatic equipment which introduces pilot-pupil in the high standards of modern aircraft, as well as extremely good flying characteristics of the TS-8 "BIES", provide versatile training of crews, by minimal expense of time and costs.

The TS-8 "BIES" is especially useful for training pilots for flying aircrafts with tricycle-landing gear.

This "BIES" aircraft may be equipped with training armament, for purpose of training of military pilots.

Conveniently located and easy perceptible flight instruments, and controls of aircraft, engine, and auxiliary equipment, enable pupil easy familiarization with flying technique and greatly reduce time required for training flights.



Advantageous aerodynamic form, smooth finish riveted metal skin, retractable landing gear and powerful but economic engine - here is the source of high performance of the TS-8 "BIES" aircraft.

Effective, pneumatically operated, slatted flaps remarkably reduce landing speed and the take off distance.

Modern design.

High load factor.

Abundant equipment.

Excellent performance.

Easy maintenance.

are the TS-8 "BIES" aircraft's qualities obtained by polish designers as a result of long-year experience. They make this aircraft one of the best among the world aircrafts of its class.

Tricycle, retractable landing gear, equipped with four pressure tires, one effective, oleo-pneumatic shock absorbers, with great deflection, protect the aircraft from the results of "hard landings", and enables operation on grass airfields.

Effective, pneumatically operated brakes, main wheels, controlled from both crew compartments, secure extremely good handling of the aircraft on the ground.

The tricycle-landing gear gives a very good stability for pilot during take off, landing or maneuvering on the ground.

Roomy cabin for two crewmembers.

Comfortable and adjustable seats, with a simple regulation of lumbar stretch.

Slide-back type canopy with extremely good visibility.

Excellent balanced control system.

Secure for the crew, comfortable and non-firing, some flight.

In the TS-8 "BIES" aircraft, pilot pupil occupies front seat.

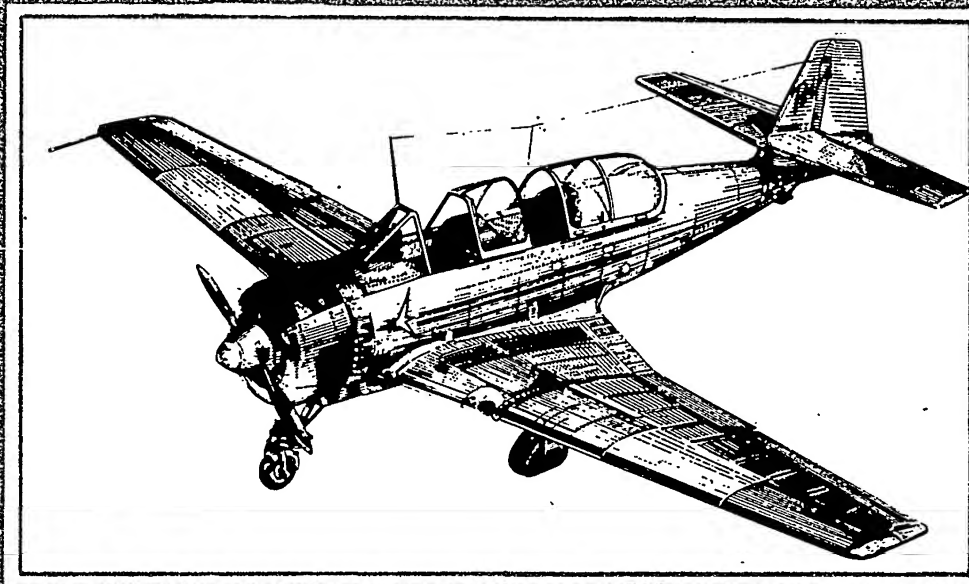
This is a factor, which enables a development of independence and self-confidence of the pupil.

Interphone installation provides communication between pilot-pupil and instructor pilot.



Aircraft TS-8 „Bies”

SHORT TECHNICAL DESCRIPTION



STAT

Motoimport

WARSZAWA

POLAND

STAT

The TS-8 "Bies" aircraft
 =====
Short Technical Description

1. General informations

The TS-8 "Bies" aircraft is designed for basic and acrobatic training: it can be used for training of air crew prior to jet flying course.

The aircraft is suitable for instrument flying training while the special version of TS-8 "Bies" can be used as a trainer for instrument landing.

The TS-8 "Bies" is a cantilever low wing two seater with tricycle retractable undercarriage. The two seats are placed in tandem in a spacious cockpit equipped with dual controls.

Ventilation of the cockpit is ensured by means of special intakes.

The transparent plexiglass canopy ensures good visibility from the cockpit. The canopy comprises two independent sliding hoods /one over each pilot's compartment/ which can be slid backwards to improve visibility in bad weather conditions. The hoods can be ejected in emergency.

Lighting of the cockpit consists of ordinary and of ultra violet lamps.

The aircraft is equipped with standard navigation lights and with set of visible from the ground green lights indicating that the undercarriage is fully lowered.

The position of the undercarriage is shown by means of indicating lights placed both in front and in the rear compartment and by visual indicators fitted in wings and in the fuselage; the latter are well visible from both seats of the aircraft.

The aircraft is of all metal, stressed skin construction. The wing consists of three sections. Ailerons, elevator and rudder are of metal construction covered with fabric. The pneumatically retracted under-

- 2 -

carriage is equipped with pneumatic brakes on the main wheels and with a shimmy-damper on the fully castoring front wheel.

The aircraft is powered by the type WN-3 four stroke, seven cylinders, air cooled, radial engine, without supercharger and reduction gear, developing 320 H.P. take off power. The aircraft can be equipped with variable pitch, constant speed air screw type WR-1 of the 2,2 m diameter or by two blade, fixed pitch wooden air screw of the same diameter.

2. Leading data

2.1. Dimensions

Span	10.50 m./34 ft. 5 ins./
Length	8.50 m./27 ft. 10 ins./
Height /cockpit/	2.25 m./7 ft. 4 ins./
Height /fin/	3.00 m./9 ft. 10 ins./
Main wheels track	2.35 m./7 ft. 8 ins./
Wheel base	2.05 m./6 ft. 8 ins./
Wing area	19.1 m ² ./212.2 sq.ft./
Fuel tank capacity	215 l./47.25 imp.gal./
Oil tank capacity	20 l./4.4 imp.gal./

2.2. Weight of aircraft

All-up weight /full acrobatics allowed, overload coeffi- cient $\frac{6}{3}$ /	1550 kg. /3410 lbs./
All-up weight /no acrobatics allowed/	1760 kg. /3872 lbs./
The weight of trainer version comprises:	
aircraft with power plant	1070 kg. /2354 lbs./
basic radio equipment	90 kg. /198 lbs./
fuel and oil	160 kg. /352 lbs./
crew	180 kg. /396 lbs./
Total	1500 kg. /3300 lbs./

- 3 -

2.3. Performance /trainer version/

Maximum speed at sea level	310 km./h. /192 m.p.h./
Cruising speed /75% power/	270 km./h. /168 m.p.h./
Stalling speed /no power, flaps up/	120 km./h. /75 m.p.h./
Stalling speed /no power, flaps down/	100 km./h. /62 m.p.h./
Speed for best rate of climb	175 km./h. /109 m.p.h./
Maximum diving speed	500 km./h. /310 m.p.h./
Maximum speed with flaps down	180 km./h. /112 m.p.h./
Initial rate of climb: with fixed pitch air screw	5.4 m./sec. /1064 ft./min./
with variable pitch air screw	6.8 m./sec. /1340 ft./min./
Ceiling:	
with fixed pitch air screw	5000 m. /16400 ft./
with variable pitch air screw	6500 m. /20992 ft./
Take off run	390 m. /426 yds./
Landing run, flaps down brakes on	200 m. /219 yds./
Flight endurance /235 H.P., 2100 r.p.m./	2.5 h.
Range	675 km. /420 miles/

2.4. Power plant

Number of cylinders	7
Swept volume	13.4 l.
Compression ratio	6.3 : 1
Flight at max. : power:	
power developed	340 H.P.
engine speed	2500 r.p.m.
specific fuel con- sumption	270 g./H.P.h.

- 4 -

Flight at take off power:

power developed 320 h.p.
 engine speed 2350 r.p.m.
 specific fuel consumption 250 g./h.p.h.

Flight at continuous rated power:

power developed 285 h.p.
 engine speed 2250 r.p.m.
 specific fuel consumption 250 g./h.p.h.

Flight at cruising power /75% take off power/:

power developed 240 H.P.
 engine speed 2100 r.p.m.
 specific fuel consumption 210 g./h.p.h.

Fuel aero-engine petrol
 72 octanes

Specific oil consumption
 /cruising/ 5 g./h.p.h.

Weight of engine 240 kg. /528 lbs./

3. Airframe construction

3.1. The outer wing

The outer wing attached to the wing centre section is of a stressed skin construction with leading edge torsion box formed by the wing nose and the front face of spar located approximately at 30% chord.

The skin of the leading edge box is of thick metal sheet and is stiffened by means of nose ribs and spanwise stringers.

Rear part of the outer wing taking ailerons and flaps loads has thin metal sheet skin.

The whole skin is fastened by means of countersunk rivets. The outer wing is attached to the wing centre section by means of flanged connection.

- 5 -

3.2. The wing centre section

The wing centre section is of stressed skin construction similar to that of the outer wing but with gradually increasing thickness of the spar booms. Right and left side of the centre section are slightly inclined downwards; they are fastened to the central part of the spar which forms the main member of the wing construction. The lugs for fuselage attachment to the wing are on the central part of the spar and on the front and rear part of the No. 1 rib.

In the rear part of the wing central section are the main wheels bays and the space for special equipment. The landing light is located on the left hand side in the wing nose of central section.

3.3. Fuselage

Fuselage is of a stressed skin construction with dural sheet skin stiffened by means of frames and Z-section longerons.

In the front section of the fuselage is located the cockpit equipped with two seats and separated from the engine by a fireproof bulkhead.

The engine mounting is attached to the fuselage by means of four bolt joints. In the lower section of the fuselage are placed three interconnected fuel tanks.

3.4. Tail unit

The tail plane is attached to the fin by means of four joints. All the control surfaces and flaps are of similar construction. It comprises a tubular steel spar and light dural sheet ribs. The tubular spar is in each case located in the nose and its additional purpose is to mass-balance the control surface.

All the control surfaces and flaps are fabric covered.

- 6 -

The control surfaces are aerodynamically balanced.

3.5. Undercarriage

Tricycle undercarriage with nose wheel is pneumatically retracted.

Main wheels legs turn on bearings located in wing centre section between the third and the fourth ribs and retract into bays in the wing centre section; the nose wheel retracts into the fuselage. When the undercarriage is retracted the bays are covered by special fairings.

The nose wheel unit is attached to the bracket of lattice construction fitted in the front part of the fuselage.

The undercarriage comprises also pneumatic legs; the nose wheel damper unit is of a two stage type.

Wheels are made of magnesium alloy and are equipped with differential pneumatic brakes. The front wheel is fully castoring and is fitted with shimmy-damper.

3.6. Controls

The aircraft is equipped with dual controls /for pupil and for instructor/. The control system is of rod and lever type while all the linkages are fitted with ball bearings.

The engine is controlled by means of push-pull rods.

The pneumatically operated flaps are linked to the actuating unit by a series of rods.

3.7. Power plant and air screw

The WN-3 seven cylinder, air cooled engine develops 320 H.P. at 2350 r.p.m.

The engine drives a two blade wooden fixed pitch air screw or a variable pitch constant speed air screw.

- 7 -

The engine cowling consists of two parts which can be easily removed for maintenance or repair work. Cowling gills in front of the cylinders enable control of the air flow during the flight. The engine is equipped with a radiator and a compressed air starter.

3.8. Cockpit accessories

Seats are designed for back type parachute and each of them can be adjusted by the pilot. Strong harness attached in an ingenious way does not hamper movements of the pilot.

Both compartments are equipped with a full set of instruments. The instrument panels are mounted on rubber Lord blocks.

3.9. Instruments

The set of instruments comprises:

- magnetic compass
- air speed indicator
- altimeter
- rate of climb indicator
- artificial horizon and turn indicator
- engine controller
- rev-meter
- clock

3.10. Basic radio equipment

The aircraft is equipped with the VHF radio set, automatic radio compass with repeaters in each compartment and an intercom.

3.11. Additional equipment for instrument flying

For instrument flying the aircraft is equipped with radio altimeter, approach receiver and gyro magnetic compass with repeaters in both compartments instead of ordinary magnetic compass.

The remote controls of radio equipment are located only in the front compartment. All the switches and knobs of radio equipment are grouped on a special panel on the pilot's

- 8 -

right hand side in the front compartment. On both sides of each compartment are placed other controls and indicators such as extinguisher lever, switches of electrical and pneumatical system, manometers etc.



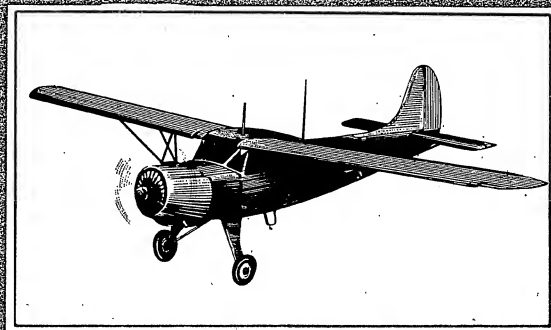
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Aircraft Jak-12M

SHORT TECHNICAL DESCRIPTION



Motoimport

WARSZAWA

POLAND

The Jak-12M aircraft

Short technical description

1. General information

The high-wing monoplane Jak-12M powered by the AI-14R air cooled engine driving the variable pitch W-530-D11 air screw may be used in three versions: as passenger aircraft, as ambulance and as agricultural aircraft. Conversion from one version into any of the two others can be carried on an aerodrome /that is in field working conditions/.

The Jak-12M aircraft is equipped with the blind flying instruments, radio set and automatic radio compass.

The spacious and well lighted cabin is ventilated in summer and heated in winter. Easily detachable inspection panels, covers and cowlings as well as comfortable access to the accessories of the aircraft simplify the maintenance and the operation of the aircraft.

The take off and landing characteristics of the Jak-12M allows operating the aircraft outside aerodromes in summer and in winter. The conversion of wheels into ski landing gear can be carried on an airfield. Good stability in the air and easy control of the aircraft guarantee full safety of the flight.

The passenger version taking full fuel supply can carry two passengers with hand luggage.

Removing the ARK-5 radio compass and filling tanks with 115 litres /25.3 imp.gallons/ of fuel only allows the aircraft to carry three passengers with hand luggage at the distance of 450 km. /280 miles/.

At short distances the aircraft can carry in the cabin 300 kg. /660 lbs./ load on the conditions that the weight of fuel in tanks does not exceed 50 kg.

- 2 -

/110 lbs./ and that the ARK-5 radio compass as well as right hand side front seat are removed.

The ambulance version can carry one patient on stretchers and a medical attendant or three sitting up patients. The medical equipment of the ambulance version ensures an adequate care of the patients during the whole flight.

The agricultural version is equipped with accessories for spraying fluids or spreading dusts, fertilizing chemicals and seeds. The equipment comprises the hopper, the feeding device, the fan with the pump and the spraying device.

2. Leading data

The Al-14R engine

Number of cylinders	9
Continuous rated power	220 H.P.
Take off power /maximum/	240 H.P.
Cruising power	165 H.P.
Specific fuel consumption at continuous rated power	240-250 g./H.P.h.
Cooling	by air flow
Engine weight	200 kg./440 lbs./

Dimensions

Length	9 m./29 ft. 6 ins./
Span	12.6 m./41 ft. 4 ins./
Tail plane span	4.03 m./13 ft. 3 ins./
Wing area with ailerons and closed extension flaps	23.86 m ² ./256.5 sq.ft./
Wheel track	2.2 m./7 ft. 4 ins./

- 3 -

Performance and weight of the passenger version and the ambulance version of the Jak-12M aircraft

Performance

Maximum speed in level flight	179 km./h./111 m.p.h./
Rate of climb at sea level	4.1 m./sec./807 ft./min./
Time of climbing:	
to 500 m./1640 ft./	2.2 min.
to 1000 m./3280 ft./	4.7 min.
Take off from concrete runway, at take off power, 2350 r.p.m. and 20° lowered flaps:	
take off run	126 m./138 yds./
take off speed	80 km./h./50 m.p.h./
take off length to clear 25 m./82 ft./	450 m./490 yds./
Take off in similar conditions as above but at continuous rated power and 2050 r.p.m.:	
take off run	150 m./160.5 yds./
take off speed	80 km./h./50 m.p.h./
take off length to clear 25 m./82 ft./	535 m./587 yds./
Landing on concrete runway with flaps lowered 40° and brakes on:	
landing run	190 m./207 yds./
touch down speed	73 km./h./45 m.p.h./
length of landing from 25 m./82 ft./	390 m./425 yds./
Landing in similar conditions as above but with flaps up and brakes off:	
landing run	465 m./507 yds./
touch down speed	82 km./h./51 m.p.h./

- 4 -

length of landing from
25 m./82 ft./ 765 m./834 yds./
Service ceiling 4160 m./13650 ft./
Time of climbing to the
service ceiling 40.1 min.
Still air range at 500 m.
/1640 ft./ 765 km./473 miles/
Flight endurance at 500 m.
/1640 ft./ 6 h 29 min.

Weights of the passenger version

Empty weights:

aircraft converted to carry
two passengers 1026 kg./2257 lbs./
aircraft converted to carry
three passengers 1002 kg./2205 lbs./

Maximum weight in flight with
two or three passengers 1435 kg./3170 lbs./

Normal weight in flight:

with two passengers 1428 kg./3141 lbs./
with three passengers 1435 kg./3170 lbs./

Useful load in normal flight:

with two passengers 402 kg./884 lbs./
with three passengers 433 kg./952 lbs./

Useful load in flight with two
passengers consists of the
following weights:

pilot 80 kg./176 lbs./
passengers 160 kg./352 lbs./
fuel of specific
weight 0,750 136 kg./299 lbs./-180 l.
oil of specific
weight 0,893 14 kg./31 lbs./
hand luggage 12 kg./27 lbs./

Useful load in flight with
three passengers consists
of the following weights:

- 5 -

pilot 80 kg./176 lbs./
passengers 240 kg./528 lbs./
fuel 87 kg./191 lbs./116 l
oil 14 kg./31 lbs./
hand luggage 12 kg./27 lbs./

Weights for the ambulance version
/stretchers and medical attendant/

Empty weight 1014 kg./2251 lbs./
All up weight 1374 kg./3023 lbs./
Useful load 360 kg./792 lbs./

Useful load in flight consists
of the following weights:

pilot 80 kg./176 lbs./
patient 80 kg./176 lbs./
medical attendant 80 kg./176 lbs./
fuel 92 kg./202 lbs./
oil 14 kg./31 lbs./
luggage or stretchers 14 kg./31 lbs./

Performance and weights of the
agricultural version of Jak-12MPerformance

Range of economical speeds 130-140 km./h./81-87 m.p.h./
Rate of climbing at sea
level for the all-up weight
of 1450 kg./3190 lbs./
at continuous rated power
dust spreading version 2,6 m./sec./512 ft./min./
spraying version 3,2 m./sec./630 ft./min./
at cruising power and
1860 r.p.m. dust
spreading version 1 m./sec./197 ft./min./
spraying version 1,2 m./sec./236 ft./min./

- 6 -

The length of grass take off run for the all-up weight of 1450 kg./3190 lbs./, with flaps lowered 22°, at take off power:

dust spreading version	124 m./139 yds./
spraying version	110 m./120 yds./

The length of grass landing run for the all-up weight of 1450 kg./3190 lbs./ with flaps lowered 22° and with brakes on:

dust spreading version	180 m./197 yds./
spraying version	

Weights

Empty weight:

dust spreading version	978 kg. /2152 lbs./
spraying version	987 kg. /2171 lbs./
All up weight	1450 kg./3190 lbs./

Useful load:

dust spreading version	472 kg. /1038 lbs./
spraying version	473 kg. /1019 lbs./

Useful load of the dust spreading version consists of the following weights:

pilot	80 kg. /176 lbs./
chemicals	300 kg. /660 lbs./
oil /supply for two hours flight/	10 kg. /22 lbs./
fuel /supply for two hours flight at sea level with the speed of 135 km./h./84 m.p.h./	82 kg. /180 lbs./

Useful load of the spraying version consists of the following weights:

- 7 -

pilot	80 kg. /176 lbs./
chemicals	300 kg. /660 lbs./
oil /supply for two hours flight/	10 kg. /22 lbs./
fuel /supply for two hours flight at sea level with the speed of 135 km./h./84 m.p.h./	73 kg. /161 lbs./

3. Construction and accessories

The fuselage structure comprises welded steel tubes and Dural ribs covered with fabric.

The front part of the cabin, covered in the upper section with transparent panels, is equipped with doors on both sides while in the rear compartment the door is fitted on the left hand side. The doors are equipped with emergency ejecting device. The cabin is equipped with ventilating and heating system.

The wing and control surface structure is made of Dural and is covered partly with Dural sheets and partly with fabric.

The tricycle undercarriage with the tail wheel is of non retractable type. Main wheels are equipped with brakes. The undercarriage is fitted with rubber rope shock absorbers and the hydraulic damper. The tail wheel is fully castoring.

The ailerons, elevators and rudders are controlled by means of cables while the flaps are pneumatically driven. The air screw is of a variable pitch.

The aircraft is equipped with the pneumatic system for engine starting, wheels braking and for flaps controlling.

Fuel tanks are of 180 litres /40 imp.gallons/ capacity while the oil tanks contains 25 litres /5.5 imp. gallons/ of oil.

Electrical installation supply the energy to lighting and navigation lamps, to instruments, radio equipment, heaters and to wiper.



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ACHIEVEMENTS OF THE POLISH CIVILIAN AVIATION

The purpose of to-day's lecture is to acquaint the Representatives of foreign Embassies and Legations accredited in Poland as well as the press representatives with the history of development and with modern problems of aircraft design in Poland after the World War II. The Polish production of both gliders and engine aircraft of low and medium power has reached a stage of technical perfection which together with achievements in both the field of pilotage and record performance enables us to speak to-day of an export of a number of products of our aircraft industry working under the trade name of Polskie Zakłady Lotnicze /PZL/.

The continuation of this name known since pre-war years is meant to couple with the good technical, productional and commercial traditions of the pre-war Polish aircraft industry. For a number of PZL aircraft known then like the fighter Super P-24, the light bomber "Sum", the bomber "Łoś", the diver-fighter "Wilk", the reconnaissance aircraft "Mewa" and the training aircraft "Wyżeł" have won a good name in the world flying opinion and a credit on a number of International Exhibitions of Paris, Milan, Belgrade and Stockholm. This resulted in efforts of commencing export of these planes to a number of countries as for instance to Bulgaria, Greece, Roumania and Turkey.

- 2 -

As a natural effect of military aircraft export a considerable export of sport aircraft and gliders was noted. This latter was influenced by the fact that both the glider and sport aircraft designs have achieved in the meantime a number of successes whereas the PZL aircraft, and especially the RWD ones have won world reputation by establishing many a world record and winning the Challenge de Tourisme Internationale competition of 1932 and 1934.

The Polish aircraft industry has also specialised in the production of light sport free balloons of high class which have achieved a number of successes in the past in the International Gordon Bennett Balloon Competitions.

In the field of aircraft combustion engines a number of original successful designs were developed in the same time such as the radial engine G-1620 and the bank engine PZL-Foka which as to their idea of construction and elaboration of detail have been rated among the leading in the world. It is also worth to be mentioned that in the field of designing compressor-and-turbine jet engines a suitable experimental engine was developed qualifying considerably in advance of contemporary works conducted in other countries respectively.

The Polish aircraft industry of that time was marked for high class of designing on the basis of original ideas, own standards and methods of high quality industrial production which won common recognition. On the other hand with regard to the production of low and medium power aircraft engines based on foreign licence the Polish aircraft industry has frequently reached achievements superior to those noted abroad.

- 3 -

The outbreak of World War II has brought Poland not only the disastrous occupation which eliminated further development of the Polish domestic aviation but also in its outcome a nearly complete destruction of aircraft industry and research establishments as well as complete devastation of airfields and flying schools. The greatest losses were suffered in the form of casualties among flying specialists, designers, pilots, mechanics and technologists.

In the field of motorless aviation the situation was favourable since already during the period following immediately the war a suitable specialist personnel was recruited and trained whereas it was possible to commence the production of prototypes and series of gliders despite primitive and hard conditions with regard to the design and production of a glider being relatively simple as compared with those of an engine powered aircraft.

The general situation in the field of engine aviation was complicated by the lack of own aircraft engine production upon which the development of various types of utility aircraft could be based. Since the needs of both civilian and sport power aviation were great since the beginning efforts were made, for obvious reasons, to meet them directly by rapidly launched production based on licences or even by foreign purchases. Thus the production offered to-day for export includes first of all aircraft based on licences purchased by Poland from the Soviet industry and represented by the aircraft "Jak- 12M" and the helicopter SM-1, of high utility values and good performance factors. These products, owing to various possibilities of their application can be used for service in numerous fields of economy.

- 5 -

and economic coefficients but also owing to the correct pilotage and good flight properties at low and high speeds and to the possibility of performing full acrobatics, to represent top achievements in its class.

Most interesting developments are noted in the field of the Polish motorless aviation.

The Polish gliders are marked for extremely quick and efficient assembly and dismantling which in case of the "Jaskółka" takes only a few minutes of time. The number of loose parts is reduced to the minimum some of the gliders being equipped with special devices serving the elimination of play occurring in fixings following long lasting use.

To the best known Polish gliders belongs the "Jaskółka" high performance single-seater of which the following versions have been developed: "Albatros", "Jaskółka-M", "Jaskółka-W", "Jaskółka-Z" and "Jaskółka-L".

Next very successful glider presenting a two-seat version of the "Jaskółka" is the "Bocian", type SZD-9 bis, also holder of many national and world records.

An interesting design development presents the single seat training and performance glider Mucha presenting various improvements of glider technique.

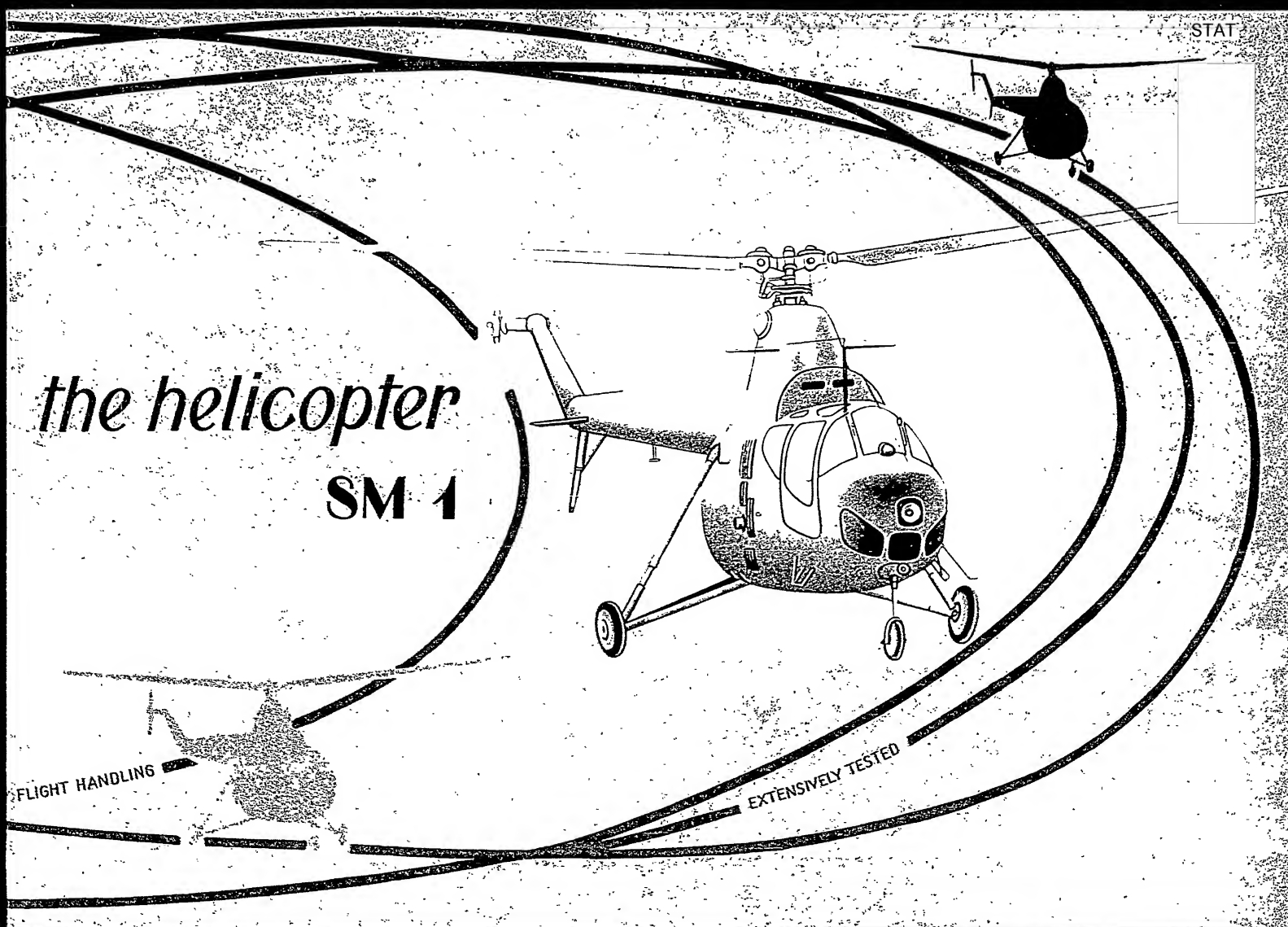
An advanced design displays the "Czapla" two-seater for both primary training, dual control flying instruction and first solo flights as well as for acrobatics learning.

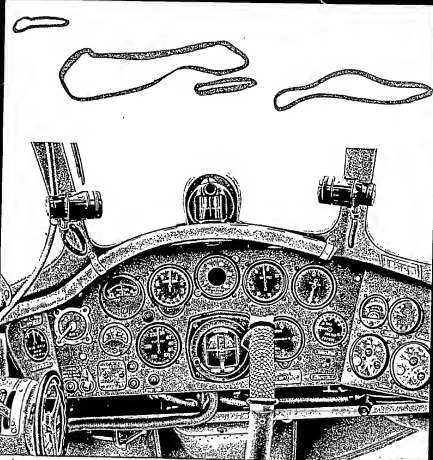
The SZD-18 "Czajka" training two-seater capable of flying with or without cabin is fitted with a wheel undercarriage of extremely soft shock absorption.

- 6 -

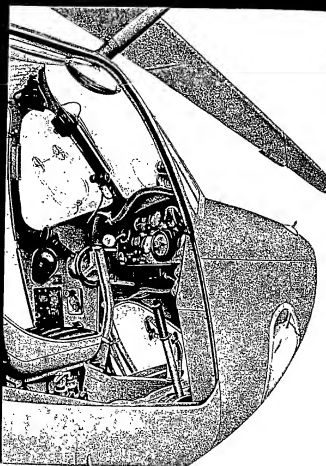
It is worth to be mentioned that the school glider craft including the IS-3, "ABC" and "Salamandra" gliders have found very wide application not only in Poland but also in the Chinese People's Republic.

Sales agents for the Polish aircraft industry are the "Motoimport" responsible for advertising, information and trade.

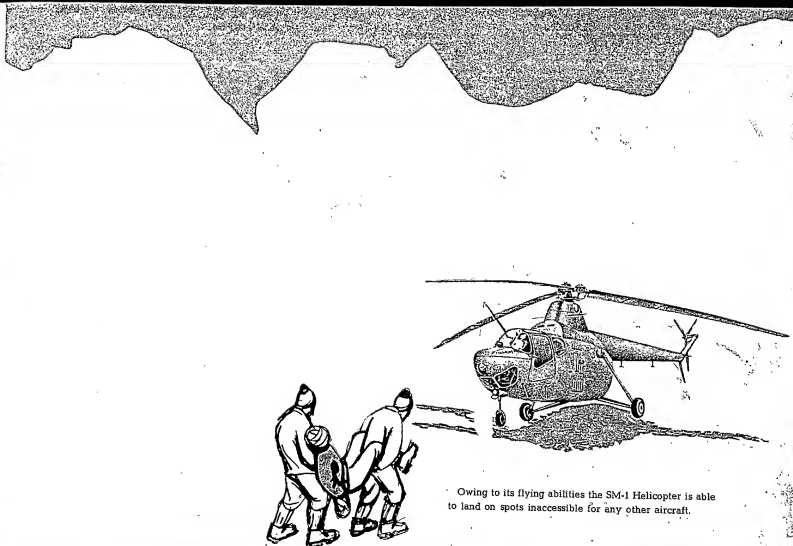




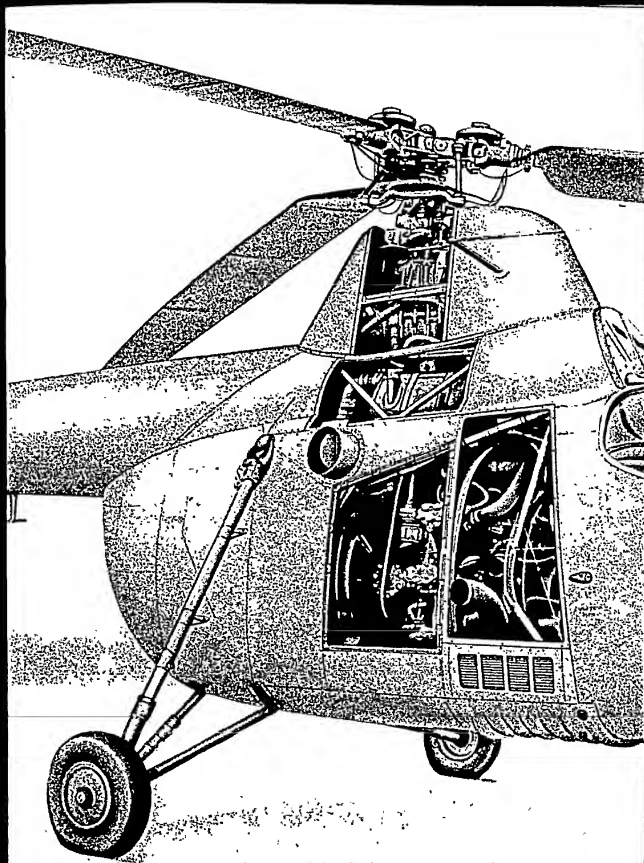
The standard pilot's controls and navigational aids are completed with modern radio equipment such as: radio-altimeter, radio semi-compass and other instruments to facilitate flying in IFR and night conditions.



The helicopter is well controllable what makes the pilotage a real pleasure.
Control trimmers allowing setting of the control stick in the desired position enable the pilot to make long flights without fatigue.



Owing to its flying abilities the SM-1 Helicopter is able to land on spots inaccessible for any other aircraft.



The helicopter is provided with a deicing installation preventing icing of the rotor blades, thus allowing the exploitation of this machine in cold climate countries.

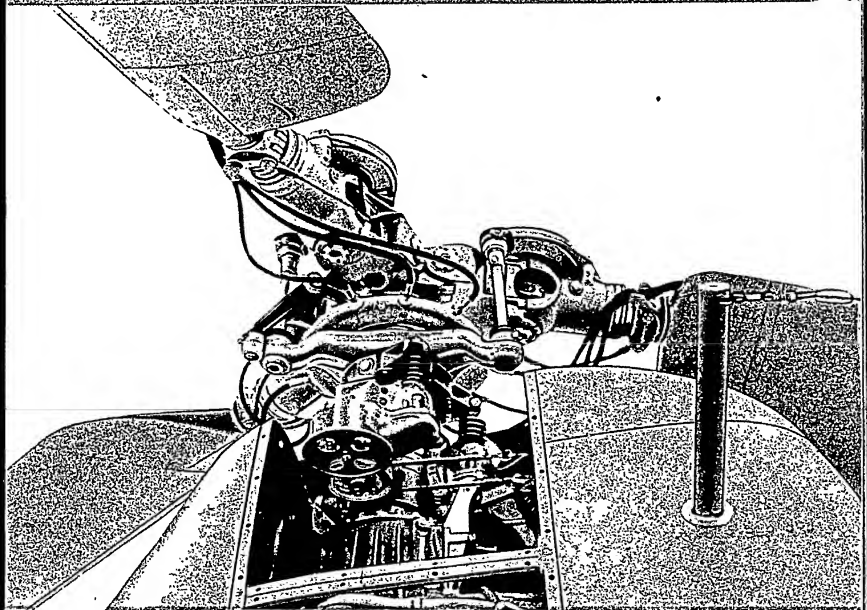
Deicing device is very rarely encountered in other types of helicopters.

The helicopter is powered by an air-cooled radial engine of 575 h.p. maximum output, with compressed air starting.

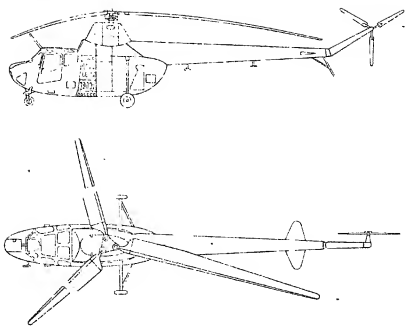
The engine develops at its maximum output a considerable surplus power over the cruising output, assuring high maximum speed, high rate of climb and high service ceiling.

This feature allows the use of the helicopter in high mountain flights.

An easy access to the engine facilitates its servicing.



The possibility of landing by autorotation is an additional characteristic feature of the helicopter SM-1. It means maximum security.



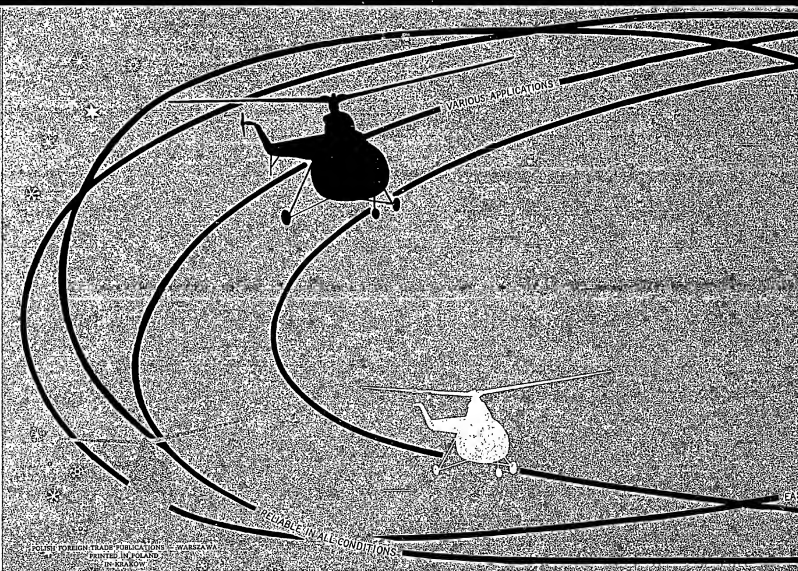
Technical Data of the SM-1 Helicopter

Main rotor diameter	14.00 m. (46 ft.)	Time of climb to	3000 m.	12 min.
Rotor blade number	3	Absolute ceiling	5000 m. (16400 ft.)	
Length without rotors	12.11 m. (39.7 ft.)	Maximum range	385 km. (238 miles)	
Overall length	16.95 m. (55.6 ft.)	Maximum endurance	3 h. 24 min.	
Overall height	3.30 m. (10.8 ft.)	Take-off power	575 h.p.	
Track	3.30 m. (10.8 ft.)	Cruising power	325 h.p.	
Weight empty	1765 kg. (3885.2 lbs.)	Fuel consumption	225-240 g./h.p.h.	
All-up weight	2250 kg. (4960.3 lbs.)		(4.86-5.29 lbs./h.p.h.)	
Useful load	465 kg. (1025.1 lbs.)			
Maximum speed in level flight	200 km./h. (124.3 m.p.h.)	Fuselage structure	— welded steel tube lattice.	
Maximum rate of climb	6 m./sec. (1162 ft./min.)	Tail boom structure	— semi-monocoque.	
Time of climb to 1000 m.	4 min.	Rotor structure	— mixed, steel and wood.	
		Rotor blades	— articulated with friction dampers on vertical hinges.	



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Specification of the JAK-12M Aircraft

DIMENSIONS:
 Span — 12.00 m. (490 ins.)
 Length — 9.00 m. (358 ins.)
 Height — 3.12 m. (123 ins.)
 Wing area — 23.86 m² (250 sq. ft.)

WEIGHTS (passenger flights):
 Empty weight — 1025 kg. (2202 lbs.)
 All up weight — 1450 kg. (3107 lbs.)

PERFORMANCE:
 Maximum speed — 182 km/h.
 (113 m. p. h.)
 Cruising speed — 150 km/h.
 (99 m. p. h.)
 Landing speed (with flaps extended) — 73 km/h.
 (45 m. p. h.)
 Rate of climb — 4.1 m./sec.
 (13 ft. min.)
 Service ceiling — 4100 m. (13649 ft.)
 Range — 755 km. (475 miles)

POWER PLANT:
 Engine — AI-14B, nine cylinder, air-cooled, rated power 240 h. p. at 2350 r. p. m.
 Propeller — two blade, metal, variable pitch.

EQUIPMENT:

The "JAK-12M" aircraft has a full set of instruments.

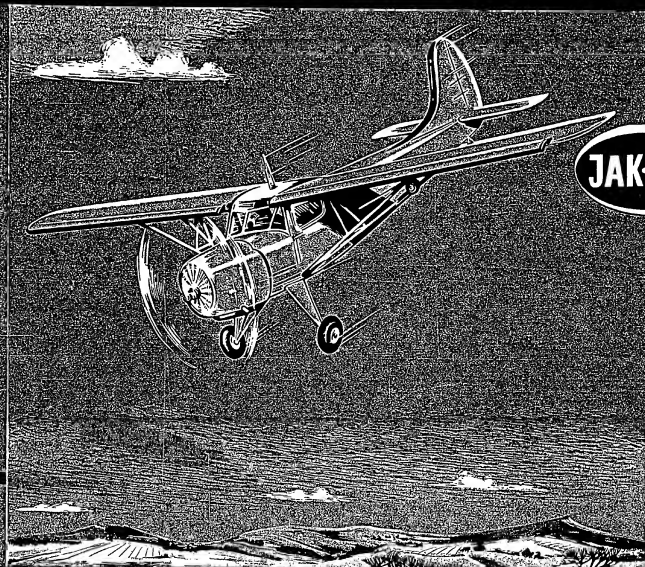
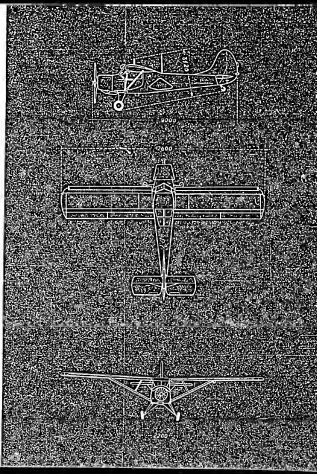
The radio equipment includes a radio-compass and a V. H. F. radio-station. The cabin has normal and ultraviolet lights. The aircraft is provided with navigation lights and a landing light.

All elements of the plane and the power plant are well accessible and easy in maintenance. A two part engine covering can be easily taken off when servicing the engine. A shutter in front of the cylinders allows to regulate air-passage during the flight.

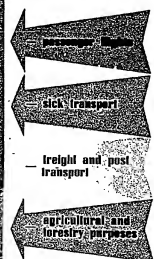
A metal frame work with fabric covering and, where danger of damage exists, sheet dural covering — is resistant enough to atmospheric effects. The slotted and strut-braced wings can be easily dismantled.

Owing to the trimmer at the elevator, which is regulated by the pilot during the flight, the aircraft is easy to fly at full range of speeds and various loads.

The steerable tail wheel can be coupled with the steering mechanism allowing easy maneuvering on the ground.

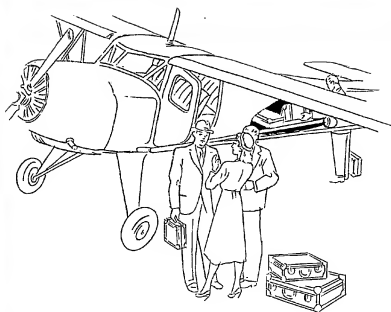
**JAK-12M**

suitable for:



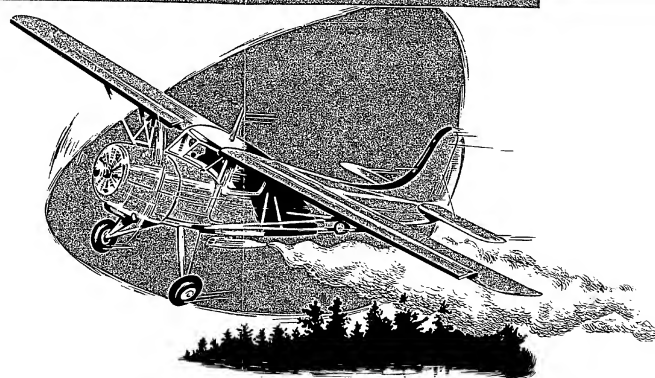
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It is very easy to adapt the equipment of the aircraft to one of its purposes and this can be performed within maximum two hours, even in field conditions.



The "JAK-12 M" aircraft can be used for the transport of 3 passengers in a comfortable, well ventilated cabin, which assures extremely good visibility for the pilot.

The aircraft is equipped with instruments which allow flights in bad visibility and at night; it can start even in difficult ground conditions.



The "JAK-12 M" aircraft can be used for crop and forest dusting and spraying purposes and for sowing chemical manure and seeds.
The spraying installation, provided with a container of approximately 300 kg. (660 lbs.) capacity for spraying or sowing material, reliable in operation and serviced by the pilot during the flight, allows during one passage to dust or spray strips of following widths:
— dusting forests, fields and gardens 60—90 m. (65—98 yards)
— spraying fields and gardens 40—60 m. (43—66 yards)

— sowing chemical manure 15—20 m. (16—21 yards)
— sowing seeds 18—22 m. (19—24 yards)
Small surface needed for starting and landing (take off and landing distance appr. 120 m (130 yards) permits operation bases to be located in the neighbourhood of areas to be sprayed.
A tight wall-plate mounted for this purpose between cabin and spraying installation protects the pilot against harmful effects of the chemicals.



The "JAK-12 M" aircraft can be used as a sanitary aeroplane for transporting a sick person on a stretcher, accompanied by a doctor or an orderly, who have full possibility to look after the patient during the flight.

The cabin is easy accessible and the sick person can be placed in and taken out of the cabin by two orderlies in a very short time.

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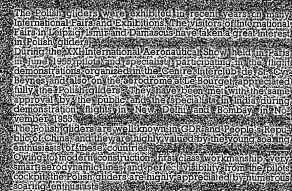
POLISH GLIDERS

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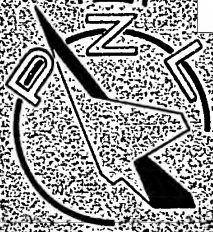
3 diamonds for 48 golden badges with 3 diamonds totally awarded, establishing at the same time 8 world records in the total number of 3732.

In the period of 1950 to 1955 the Polish pilots on Polish gliders established 19 world records and 108 country records. They got at the same time 182 diamonds on their golden badges for high performance flying.



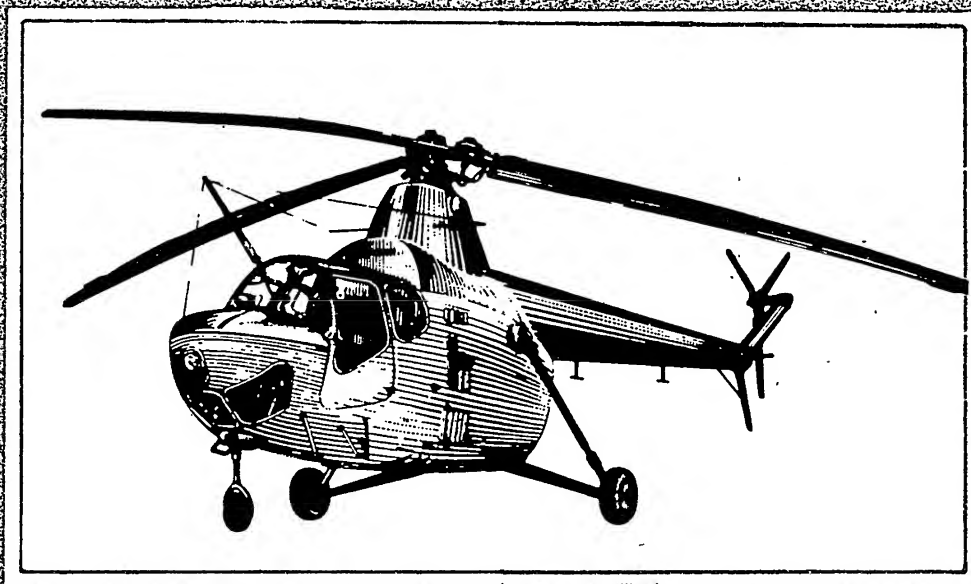
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Warsaw, Poland P.O. Box 365
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STAT



Helicopter SM-1

SHORT TECHNICAL DESCRIPTION



Motoimport

WARSZAWA

POLAND

The SM-1 helicopter

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Short technical description

1. General information

The SM-1 helicopter is designed to carry two or three passengers. The machine can be used for various special purposes such as rescue action in inaccessible terrain /mountains, forests, marshy grounds/ and water or, after introducing certain modifications, for agricultural application /insecticide spraying and dusting of fields, forests, and orchards, topdressing and seed spreading/.

The helicopter is suitable for operation in various climate conditions; the machine is equipped with special antifreeze devices which enable its operation in arctic climate.

The helicopter is powered by the AI-26 W seven, cylinder, radial piston engine cooled by forced air flow.

The SM-1 helicopter employs three bladed lifting rotor, tricycle undercarriage and a motocar type cabin for pilot and passengers. In the cabin is mounted the seat for a pilot and the bench type seat for two passengers with parachutes /the bench can accommodate three passengers without parachutes/. The helicopter is equipped with accessories enabling day and night flying.

The machine can hover and it is capable of vertical take off and vertical landing. The hovering enables passengers to get on board or to alight by means of a rope ladder in inaccessible places where landing is not possible.

2. Leading data

2.1. Dimensions

Main rotor diameter 14.3 m./47 ft./

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Number of main rotor blades 3
 Disc area 160.5 m² /1726 sq.ft./
 Length of fuselage 12.11 m./40 ft. 9 ins./
 Maximum sweep 16.95 m./56 ft. 7 ins./
 Wheel track 3.3 m./10 ft. 10 ins./
 Wheel base 3.75 m./10 ft. 5 ins./
 Height 3.3 m./10 ft. 10 ins./
 Ground clearance 0.4 m./1 ft. 4 ins./
 Range of main rotor collective pitch control from + 1° to + 13°
 Tail rotor diameter 2.5 m./8 ft. 3 ins./
 Number of tail rotor blades 3
 Range of tail rotor pitch control from - 6° to + 11°

2.2. Weights

All up weight 2250 kg. /4950 lbs./
 Weight empty 1785 kg. /3927 lbs./
 Usefull load:
 pilot 80 kg. /176 lbs./
 two passengers 160 kg. /352 lbs./
 fuel 175 kg. /385 lbs./
 oil 25 kg. /55 lbs./
 de-icing fluid 25 kg. /55 lbs./
 Total... 465 kg. /1023 lbs./

2.3. Performance

Maximum speed /level flight/
 at sea level 200 km./h. /124 m.p.h./
 at 1000m./3280 ft./ 185 km./h. /115 m.p.h./
 at 2000m./6560 ft./ 185 km./h. /115 m.p.h./
 above 2000 m. /6560 ft./ 175 km./h. /109 m.p.h./

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Maximum vertical climb rate at continuous

rated power:

at sea level 4 m./sec. /788 ft./min./
 at 1000 m./3280 ft./ 4.6 m./sec. /906 ft./min./
 at 2000 m. /6550 ft./ 5.1 m./sec. /1005 ft./min./
 at 3000 m. /9840 ft./ 3.5 m./sec. /690 ft./min./

Maximum vertical climb rate at maximum power:

at sea level 6.5 m./sec. /1280 ft./min./

Economical speed

for climbing 90 km./h. /56 m.p.h./

Climbing time:

to 1000 m. /3280 ft./ 4.3 min.
 to 2000 m. /6550 ft./ 7.8 min.
 to 3000 m. /9840 ft./ 12.0 min.

Hovering ceiling

Service ceiling 3000 m. /9840 ft./
 5000 m. /16400 ft./

/normal equipment of the helicopter does not comprise oxygen system - the machine should not operate above 4000 m. /13120 ft./

Maximum still air

range at 1000 m. /3280 ft./ with speed of 140 km./h. /87 m.p.h./ 385 km. /239 miles/

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Endurance of flight,
at 1000 m./3280 ft./
with speed of 90 km./h.
/56 m.p.h./ 3 h. 24 min.

2.4. Power plant

Number of cylinders 7
Swept volume 20.6 l.
Compression ratio 6.4 : 1
Flight at take off
power:
power developed 575 H.P.
engine speed 2200 r.p.m.
boost 890 mm. Hg /35 ins.Hg/
specific fuel
consumption 290-320 g./H.P.h.
Flight at continuous
rated power at sea
level:
power developed 430 h.p.
engine speed 2050 r.p.m.
boost 760 mm.Hg /30 ins.Hg/
specific fuel
consumption 260-275 g./H.P.h.
Flight at continuous
rated power at
2200 m./7246 ft./:
power developed 460 H.P.
engine speed 2050 r.p.m.
boost 760 mm.Hg /30 ins.Hg/
Flight at cruising
power /75% of
continuous rated
power/ at sea level:
power developed 322 h.p.
boost:
at 1960 r.p.m. 630 mm.Hg /25 ins.Hg/
at 1860 r.p.m. 960 mm.Hg /38 ins.Hg/

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specific fuel
consumption:
at 1960 r.p.m. 230-255 g./H.P.h.
at 1860 r.p.m. 225-240 g./H.P.h.
Flight at cruising
power /50% of
continuous sea level
rated power/:
power developed 215 H.P.
engine speed 1860 r.p.m.
boost 575 mm.Hg /22.5 ins.Hg/
specific fuel
consumption 240-270 g./H.P.h.
Maximum time of
engine running:
at take off power 5 min.
at continuous rated
power 60 min.
at cruising power unlimited
Fuel Aero engine 92 octane
petrol
Maximum oil specific
consumption 15 g./H.P.h.
Dry engine weight 445 kg. /979 lbs.:/

2.5. Gearing

Reduction ratio
between main shaft
and engine 1 : 1.295
Reduction ratio
between main rotor
and engine 1 : 8.85
Reduction ratio
between tail rotor
and engine 1 : 1.52
Reduction ratio between
cooling blower and
engine 1 : 1

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3. Construction

3.1. Fuselage

The fuselage is made of chrom-mn-sil steel welded tubes; the construction is covered with non-stressed skin Dural panels while the transparent sections are covered with plexiglass. The cabin is located in the front part of the fuselage. The transparent sections of the cabin ensure good front and side visibility while two special bulged side windows enables certain visibility backwards. The cabin is equipped with a motocartype door.

Engine and engine cooling blower are mounted in engine compartment placed in the centre section of the fuselage. Main gearbox is mounted in the upper part of the fuselage above the engine.

In the rear section of the fuselage, behind the engine compartment, is mounted a Dural fuel tank of 240 litres /53 imp.gallons/ capacity. The adjustable tail plane and the tail skid with rubber foot are fitted at the end of the fuselage rear section which is of truncated cone shape.

Inside the fuselage rear section and the tail boom run transmission shaft of the tail rotor drive, push-and-pull rods controlling tail plane position and cables of tail rotor pitch control system. Leading edge of the tail plane is made of Dural and the remaining part is fabric covered.

3.2. Power plant

The engine is equipped with a clutch engaging the transmission and with axial flow cooling blower comprising flow steering baffles. The air filter of the engine is mounted on the right hand side of the machine. Exhaust gasses run through the exhaust manifold comprising two parts ending

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on both sides of the machine.

The fuel system comprises special oil valve for oil dilution when the helicopter is operating in low temperature conditions. The oil tank is of 32 litres /7 imp.gallons/ capacity. The oil is cooled by means of two radiators.

The engine is equipped with compressed air starting device comprising compressor and two bottles of 4 litres /0.9 imp. gallons/ capacity each.

The fire-fighting system consists of two bottles with carbon dioxide and of an alarm device warning the pilot about the increase of temperature. Engine cooling can be controlled by means of a set of adjustable gills.

3.3. Transmission

From the engine the drive is taken up to the main rotor and to the transmission.

The transmission comprises: the engine reduction gear fitted on the engine, the main gear box mounted above the engine, the intermediate gearbox located in the rear section of the fuselage, the tail rotor gearbox mounted near the tail rotor and various shafts connecting the gearing.

The vertical main shaft connecting the engine reduction gear with the main transmission gear is attached to the gears by means of two elastic clutches dumping the torsional vibration.

The main transmission gear employs a pair of spur gears for reduction of main rotor speed and a pair of bevel gears for reduction of tail rotor speed.

The main transmission gear is connected with the intermediate transmission gear by means of a shaft rotating in five bearings and fitted with four universal joints compensating any

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strain of the shaft.

The intermediate transmission gear does not change the speed of the shafts and its sole purpose is to alter the direction of the shaft connecting the main transmission gear with the tail rotor transmission gear. The latter finally reduces the speed of the tail rotor.

3.4. Flying controls

The control of the helicopter flight is obtained by means of changing the magnitude and the direction of the main rotor lift and by changing the tail rotor thrust.

The flying controls of the helicopter consist of:

- lever for control of pitching and rolling,
- lever for mixed control of rotor pitch and thrust and of tail plane position,
- pedals for yawing control,
- steering wheels for balance device control.

3.5. Main rotor /lifting rotor/

The three blades of the main rotor are connected by means of vertical and horizontal toggle joints to the hub mounted on the main transmission gear shaft. To prevent the ground resonance special friction-dampers are fitted on the vertical toggle joints. Near the hub the blades are rectangular while the parts nearer to the blade tips are of the trapezium shape. The blade comprises the steel spar of varying section and of ribs rivetted to the spar. The blade is covered with plywood and fabric.

To the leading edges of the blades are attached special fittings with openings through which the antifreezing fluid flows on the blade surface.

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3.6. Tail rotor

The variable pitch tail rotor comprises three wooden blades with metal fittings. The blades are also equipped with the antifreezing device.

3.7. Undercarriage

Tricycle undercarriage allows taxiing on the ground and vertical as well as runway take off and landing. The legs are of a oleo-pneumatic type.

The tyres are of low pressure type; the front wheel is fully castoring.

3.8. Antifreezing system

The antifreezing system prevents the forming of ice on main rotor blades, tail rotor blades and on the windscreen by means of washing their surfaces with special antifreezing fluid. Beside that the windscreen is heated from the inside of the cabin by means of a hot air flow. Antifreezing fluid is spread on the windscreen surface by means of a wiper. The main tank containing antifreezing fluid is of 28 litres /6 imp.gallons/ capacity and the auxiliary tank can take 2.5 litre /0.6 imp. gallons/.

3.9. Electrical equipment

The electric energy is supplied by a generator and 28V batteries. They supply the energy to instruments, electric motors, heating units, lighting points, signaling devices and to radio equipment.

The lighting of the helicopter comprises the ceiling lamp in the pilot's compartment, the instrument panel lamp, the compass lamp, landing and taxiing light and navigation lights fitted on both sides of the fuselage and on the tail.

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3.10. Radio equipment

The radio equipment comprises a receiver--
-transmitter radio set, radio-compass and
radio altimeter.

3.11. Auxiliary accessories

The auxiliary accessories comprise the
flare pistol and flares and the first aid
equipment.



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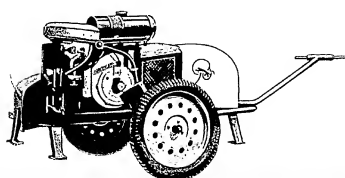
Zapła

Rocian

Mucha
100



PULLING-IN-WINCH "RYS"



SPECIFICATION

Engine 4-cylinder, 4000 rpm, 20 hp (gasoline)
Cylinder capacity 300 cm³ (2.1 in.³)
Overall dimensions
Length (under carriage excluded) 1240 mm (80 in.)
Width 1000 mm (31 in.)
Height 1100 mm (36 in.)
Weight 244 kg (536 lb.)
Pulling strength 50 kg (110 lb.)

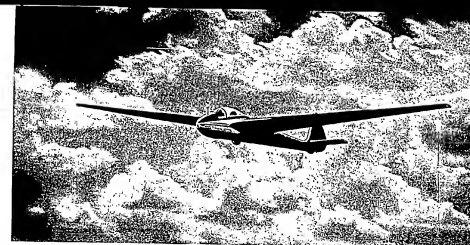
The glider pulling-in-winch works together with a launching winch.

The pulling-in-winch is an auxiliary machine intended for lowering the rope of the "ZUBR-3" winch to the launching place from the place of releasing the glider. The pulling of the rope by means of the pulling-in-winch starts a lot of time in comparison with manual pulling in or by means of motorcar.

The pulling in of the launch-winch rope from a distance of 1000 meters by means of the pulling-in-winch "RYS" does not exceed 30 seconds. At the well organized glider launching disposing of no more than one set of "ZUBR" and "RYS" winches one launch can be performed every 2-3 minutes.

The pulling-in-winch "RYS" is provided with one cylinder, two stroke, air cooled petrol engine of "S-62" type with magneto ignition. The pulling-in rope drum with claw clutch and drop type brake is acting in the same way as that of the "ZUBR-3" winch. The lowering rope reeling device and safety sensors are located on the drum. The folding type saddle for the operator is provided in front of the control board. The housing made of metal sheets and wire binding serves for covering the pulling-in-winch mechanism.

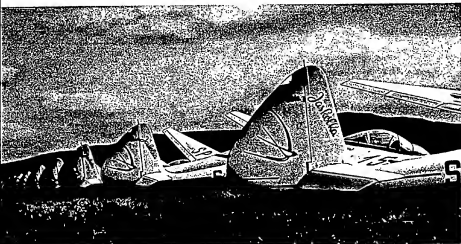
Jaskółka



HIGH PERFORMANCE SINGLE-SEAT GLIDER

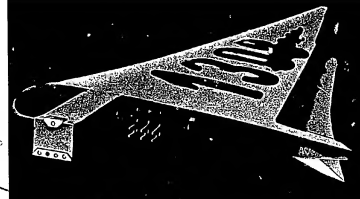
The following world records have been established on the Jaskółka glider:

Men's speed over 1000 km (621 miles) triangular circuit 247.6 km/h (53.86 mph) over 200 km (124.2 miles) triangular circuit 167.304 km/h (41.8 mph) over 100 km (62.1 miles) triangular circuit 125.864 km/h (31.5 mph) over 50 km (31.1 miles) triangular circuit 132.8 km/h (32.9 mph) over 25 km (15.5 miles) triangular circuit 132.8 km/h (32.9 mph) over 10 km (6.2 miles) triangular circuit 132.8 km/h (32.9 mph)

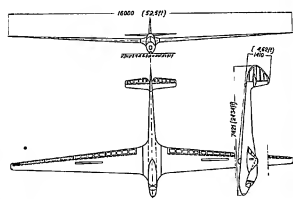
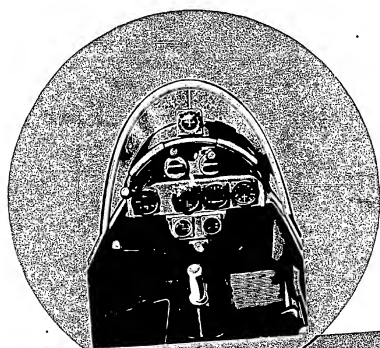


"JASKOLKA" is a modern high performance glider designed for high performance and record flights. Further it can be used for training flights both for thermal soaring and flight in clouds without visibility. The construction of this glider meets all demands of modern aviation owing to the aerodynamic design as well as to its excellent piloting facilities. The additional advantage of the "JASKOLKA" glider consists of the automatic coupling devices for the control system which allow for keeping it in small hangars ensuring its very rapid and easy preparation for flight (within 3-10 minutes). "JASKOLKA" is outfitted with a complete electric equipment including lights and lightning protector.

This glider can be equipped on request with oxygen apparatus and total energy variometer. The standard equipment of instrument panel consists of airspeed indicator, variometer, altimeter, compass, and electric turn and slip indicator with cross level. Moreover, the plane is equipped with a set of tools and covers for canopy protection.

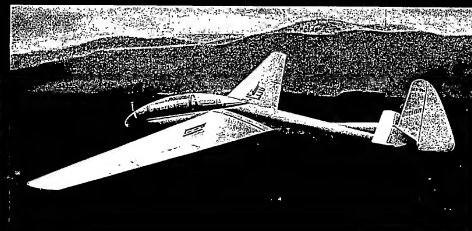


"JASKOLKA" is a cantilever mid-body mounted wing glider of wooden construction. The monoplane wings are covered with plywood. The ailerons are in two parts, of split type, differentiated and aerodynamically compensated. The Fowler flaps may be set in three positions for 0° , 12° , and 25° . The diving brakes are of scissor type. The fuselage of oval cross-section is entirely covered with plywood, it has in its front portion the pilot's cockpit with plexiglass canopy. A single wheel undercarriage is provided, half-retracted in the fuselage. This wheel is provided with a mechanical brake, synchronized with the air brakes. Further, the fuselage is provided with a short front skid, front and bottom tow-hooks for aero-tow or winch-launching, front and rear tow-hooks for launching by means of rubber rope when in slopes.



SPECIFICATION:

Total max. weight in flight — 340 kg (748, 20 lbs.)
 Weight of pilot (equipment included) — 20 kg (217.88 lbs.)
 Wing loading — 26 kg/m² — (5.12 lbs./sq. ft.)
 Best gliding ratio (at 80 km/h) 40:1
 Max. climb speed (at 80 km/h) 12.3 m/sec (24.9 ft/sec)
 Max. permissible airspeed 240 km/h (136.7 m.p.h.)
 Max. speed in maneuvers 210 km/h (124.3 m.p.h.)
 Max. speed at aerodrome 210 km/h (130.3 m.p.h.)
 Max. climb speed 220 km/h (136.7 m.p.h.)
 Max. speed with extended flaps 120 km/h (74.5 m.p.h.)
 Flap down speed 140 km/h (86.9 m.p.h.)
 Max. permissible airspeed 140 km/h (86.9 m.p.h.)
 Breaking load factor 10.5 g

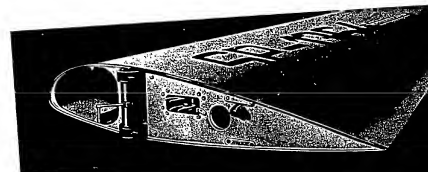
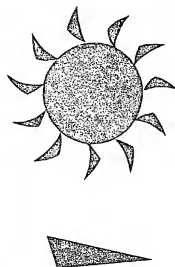
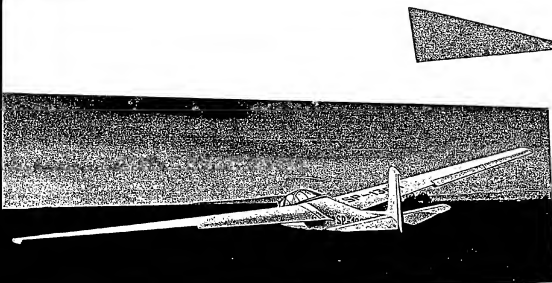


Rocian

HIGH-PERFORMANCE TWO SEATER

holder of following world records

Men: speed over 200 km.
 (122.4 miles) triangular
 circuit 88,048 km/h
 (41.02 m.p.h.)
 speed over 300 km
 (186.3 miles) triangular
 circuit 50,328 km/h
 (31.25 m.p.h.)
 Women: speed over 200 km
 (122.4 miles) triangular
 circuit 50,341 km/h
 (31.3 m.p.h.)

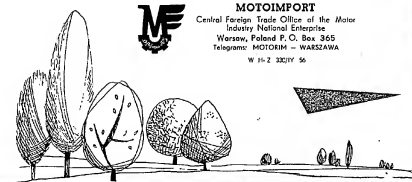


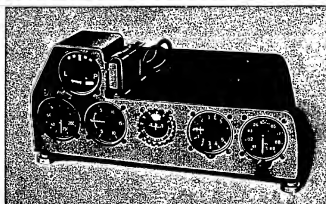
This glider is provided with an instrument panel equipped in airspeed indicator, altimeter, two variometers, compass and an electric turn and slip indicator with a cross level; covers for canopy protection and a set of tools.

"BOCIAN" — an excellent modern high-performance glider highly appreciated for its aerodynamic characteristics, spacious comfortable cockpit and many advantages of easy service when on the ground.
"BOCIAN" is particularly recommended for a rapid initial training of pilots for engine driven aircrafts. The essential features of "BOCIAN" are perfect visibility from both cabins, placed almost entirely in front of the wing, the perfect manoeuvrability, easy effortless control handling and, piloting.
A great advantage of "BOCIAN" (like "askolka") is an automatic command coupling, which minimizes the time of assembling of the glider and next, the electric equipment including lighting installation and lightning protector.



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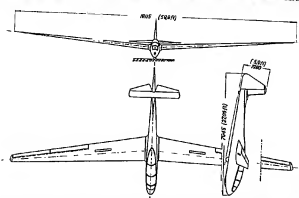


BOCIAN™ is a cantilever mid-body mounted wing glider, two-seater of wooden construction. Its fuselage contains a comfortable cockpit with two seats in tandem. The rear seat is located in the centre of gravity enabling this one pilot flights without ballast weights.

The wing in two parts of single spar type has a stiff ply-covered of a box. The wing has a forward sweep. The ailerons in two parts, differentially operated and aerodynamically compensated have a separate control handling for each part. Air brakes are of scissor type, and have an automatic blocking of control command when retracted.

The fuselage of oval cross section is entirely covered with plywood. The cockpit has a plexiglass canopy.

The landing wheel and a short front skid are under the fuselage. The wheel is provided with a mechanical brake synchronised with the air brakes. The grips designed for glider carrying off are located before the tail unit. They facilitate the transport of the sailplane when on the ground.



SPECIFICATION

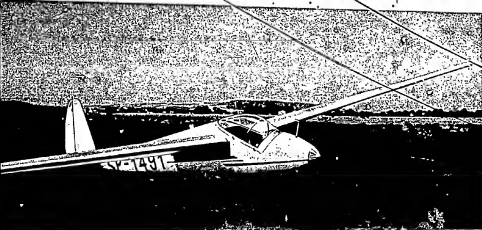
Empty weight 200 kg (440.8 lbs.)
Weight of crew (equipment included) 170 kg (374.8 lbs.)
Wing loading 28 kg/m² (5.72 lbs./sq. ft.)
Max. gliding ratio (at 80 km/h) 26:1
Max. gliding speed (at 77 km/h) 0.62 m/sec (2.69 ft/sec)
Max. permissible speeds:
Max. speed at winch start 115 km/h (71.41 m.p.h.)
Max. speed at air show 140 km/h (86.94 m.p.h.)
Max. cruise speed 200 km/h (124.4 m.p.h.)
Max. speed with extended air brakes 180 km/h (111.6 m.p.h.)
Flight in clouds 30 km/h (30.73 m.p.h.)
Stalling speed 53 km/h (32.28 m.p.h.)
Max. permissible stressing factor in breaking load factor n = 1.10, 5 - 8.25

Mucha
100

THE SINGLE-SEAT TRAINER
FOR PERFORMANCE GLIDER

The single seat trainer and performance glider MUCHA 100 is an improved type of glider MUCHA 70, glider holder of following Polish records:

Men's open height distance 1st 134 m (439 ft)
Women's open height 1st 122 m (398 ft)
Wing load 1st 28 kg/m² (5.72 lbs./sq. ft.)
Gain 1st 100 km/h (62.14 m.p.h.)
Max. altitude 1st 3000 m (9843 ft)



"MUCHA 100" an inexpensive glider is perfectly suited for, thermal and slope-soaring, as for flights in clouds. Good aerodynamic features, simple handling, perfect finishing and comfort are the characteristics of the machine. Owing to its up-to-date construction the "MUCHA 100" glider meets all modern requirements. It is to be added, that neither tools nor additional elements are necessary for assembling and dismantling the "MUCHA 100".

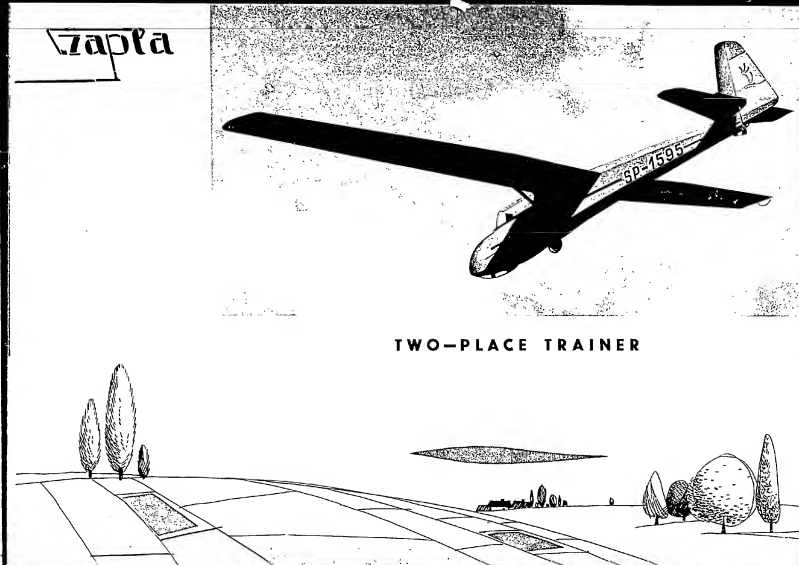
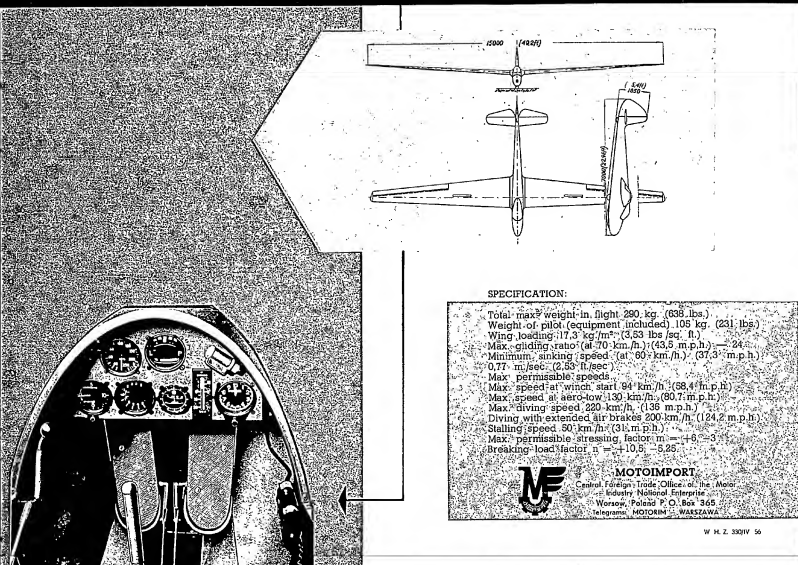
The instrument panel is fitted with airspeed indicator, altimeter, variometer, electric turn and slip indicator with cross level, longitudinal clinometer and compass. Further this glider is outfitted with electric installation, lightning protector as well as with covers for canopy and Venturi tube protection. On request this glider can be equipped with oxygen breathing apparatus.

"MUCHA 100" glider is a single-seater with cantilever wings, entirely built of wood. The monospar wing with oblique auxiliary spar has a ply-covered leading edge stiff against torsion (brass box). The undivided ailerons differentially operated are aerodynamically compensated and mass-balanced. Air brakes are of scissor type.

Longitudinal oval cross section fuselage is entirely plywood-covered. The cockpit with the streamlined plexiglass canopy is outfitted with a comfortable seat, with safety-belts and tarpaulin covered back-rest, which declivity can be regulated on the ground. This glider is outfitted with front and bottom tow-hooks as well as with a starting hook for the launching by means of rubber rope.

The transport wheel and short front and rear skids are located under the fuselage. The skids are shock-absorbed by means of rubber pads. The skids facilitate the take-off and ensure a smooth landing. A folded grip located before the tail unit is provided for carrying the tail when manoeuvring on the ground.

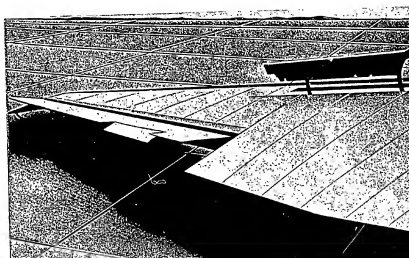






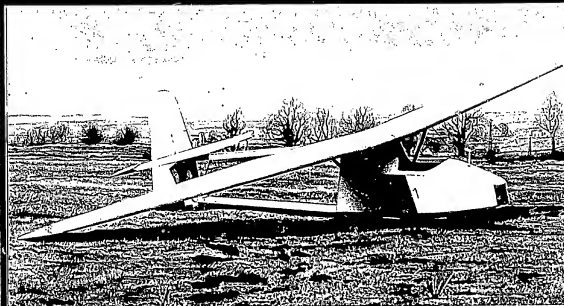
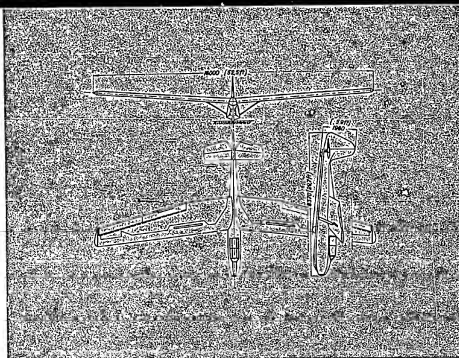
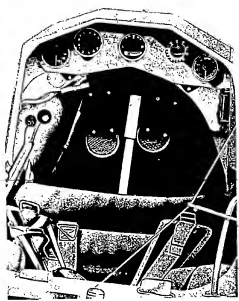
Two-place trainer, designed both for primary training, dual control flying instruction and first solo flights as well as for acrobatics learning.
The glider distinguishes itself by a security of flight, easy control handling, long life, and insensibility against various flight irregularities. Good shock-absorbing properties of its landing wheels allow for a hard beginner-landing.
The spacious cockpit ensures full comfort for the crew during the flight. Also the instructors task lasting often many hours is much eased. The aerodynamic features, and rigidity of "CZAPLA" enable the flight in clouds.

The standard equipment consists of:
— instrument panel with airspeed indicator, electric turn and slip indicator with cross level, compass, variometer and mechanical tow release indicator;
— set of tools for assembling and dismantling of the glider;
— covers for canopy and Venturi tube protection.



"CZAPLA" is a strut braced high wing glider built of wood. The wings are of monoplane construction. The strut braced wings (metal struts have a streamline shaped section) are outfitted with air brakes of split type. The differentiated ailerons of split type are aerodynamically compensated and outfitted with air brakes. The fuselage is of monocoque construction covered entirely by plywood. The crew cockpit with a plexiglass canopy is located in front of the wing. The metal plate door is located in the fuselage behind the cockpit. The landing gear is of the fixed gear type with shock absorbers. The shock absorbers is fixed under the fuselage in front of the centre of gravity. The landing gear is of the fixed gear type with shock absorbers. The landing wheel has a transverse rotation and the air brakes of the fuselage is of the split type. The front skid shock absorber by means of rubber disc. Tail skid is shock-absorbed with rubber disc.

czapla



Salamandra

SINGLE-SEAT TRAINER

SPECIFICATION:

Total max. weight in flight 440 kg. (968 lbs.)
 Weight of crew (equipment included) 160 kg. (353 lbs.)
 Wing loading (crew): two pilots, each weighing 70 kg.
 (154 lbs.) 17.5 kg/m² (3.50 lbs./sq. ft.)
 Best gliding angle (at 64 km/h.) (39.8 m.p.h.) -17.1
 Best gliding angle (at 58 km/h.) (36.1 m.p.h.) 0.06 m./sec.
 Min. sinking speed (at 58 km/h.) (36.1 m.p.h.) (3.15 ft./sec.)
 Max. permissible speeds.
 Max. speed at winch start 100 km/h. (62.1 m.p.h.)
 Max. speed at aero-tow 110 km/h. (68.3 m.p.h.)
 Max. diving speed with air brakes extended or retracted
 160 km/h. (99.4 m.p.h.)
 Stalling speed 40 km/h. (24.8 m.p.h.)
 Max. permissible stressing factor $n = +4.5, -2.25$
 Breaking load factor $n = +7.5, -3.5$

- Single seat trainer "SALAMANDRA 53" characterized by an easy control handling is suitable for pilots trained on school-gliders, prior to pass on the training gliders of higher category. Its relatively high aerodynamic performance enables the thermal and slope soaring and even the performance flights.

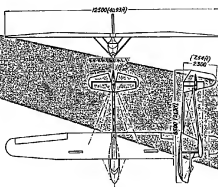
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 Central Foreign Trade Office of the Motor
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 Warsaw, Poland P. O. Box 355.
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"SALAMANDRA" is a strut braced high wing glider with framed body, made out entirely of wood. The monopar wing in two parts rear auxiliary spar has differentially operated ailerons and air brakes. The framed body lies in its rear-portion the crossed planowires. The cockpit, open type with a small windshield is situated in the front portion of the fuselage. The wooden landing skid, shock-absorbed with two tyres is situated under the cockpit. The instrument panel is fitted in three basic flight instruments: airspeed indicator, variometer and altimeter. The knob of the front release is located close by the instrument panel.

SPECIFICATION:

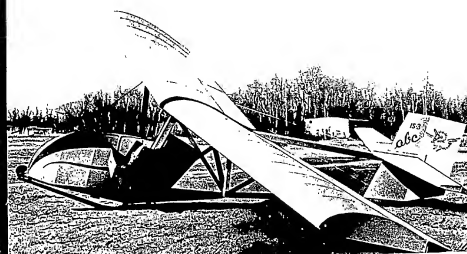
Total max. weight in flight 225 kg (495 lbs)
Weight of pilot (equipment included) 85 kg (187 lbs.)
Wing loading 13.30 kg/m² (2.73 lbs/sq. ft.)
Max. gliding ratio (at 49 km/h) (30.45 m.p.h.) -12.2
Min. sinking speed (at 47 km/h) (29.2 m.p.h.) 0.55 m/sec.
(2.19 ft./sec.)

Max. permissible speeds:
Max. speed at wing 214 km/h (132 m.p.h.)
Max. speed at wing 214 km/h (132 m.p.h.)
Max. speed with extended airbrakes 100 km/h (62 m.p.h.)
Sinking speed 35 km/h (21.7 m.p.h.)
Max. permissible airspeed factor 1.4
Breaking load factor 1.4



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SINGLE-SEAT PRIMARY TRAINING GLIDER



"SALAMANDRA" is a design of primary training glider, partly for training in the field, partly for launch launching and in mountainous country at launching by means of rubber rope.

The winch "ZUBR 3" is mounted on steel-framing located on a bi-wheeled undercarriage provided with an independent suspension and shock-absorption by means of spiral springs.

The winch when working is put four fixed legs by means of a special jack.

The winch "ZUBR 3" is provided with a 6-cylinder, four stroke, top valve, water cooled petrol engine of "S-42" type, arranged a unit with clutch and gearbox. The winch-launch set consists of a cable drum with drop type brake, rope reeling device on the drum and security scissors.

The winch "ZUBR" is provided with signalling lights for the launching. A speedometer, indicating the speed of the drum reeling the towing cable as well as the instruments controlling the engine's work i.e. oil pressure gauge, cooling water thermometer and an amperometer are located on the instrument panel in the cabin.

SPECIFICATION:

Engine power (at 2.800 r.p.m.) 85 h.p. (83,8 b.h.p.)

Cylinder capacity 4188 ccm. (255 cu. in.)

Length of the towing rope on the drum 1200 m. (3940 ft.)

Overall dimensions:

Length (shaft excluded) 2760 mm. (9,05 ft.)

Width 1810 mm. (5,94 ft.)

Height 1280 mm. (4,18 ft.)

Weight 1440 kg. (3168 lbs.)



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